4.2 BIOLOGICAL RESOURCES

This section addresses biological resources that could be affected with implementation of the proposed project. The information presented is based on literature reviews and a review of existing documentation for the project. As explained in the IS (included as Appendix C of this draft environmental impact report), impacts on terrestrial biological resources (i.e., those resources that use habitat types other than aquatic, riparian, or wetland habitats) would be less than significant. This issue is addressed in the impact analysis.

4.2.1 REGULATORY SETTING

Biological resources in California are protected and/or regulated by a variety of federal and state laws and policies. In addition, in many parts of California, planning efforts are underway to conserve local or regional habitat and species. Many regulations applicable to biological resources do not include water quality issues; however a number do, particularly those relating to fisheries and other aquatic resources. Key regulatory and conservation planning issues applicable to the proposed project are discussed below.

FEDERAL REGULATORY SETTING

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA) the U. S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries Service), formerly National Marine Fisheries Service (NMFS), have regulatory authority over federally listed species. Under ESA, a permit is required for any federal action that may result in "take" of a listed species. Section 9 of ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under federal regulations, take is further defined to include the modification or degradation of habitat where such activity results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Clean Water Act

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) before performing any activity that involves discharge of dredged or fill material into "waters of the United States," including wetlands. Dredge and fill activities range, but involve any activity, such as construction, that results in direct modification (e.g., alteration of the banks, deposition of soils) of an eligible waterway. Waters of the United States include navigable waters, interstate waters, and other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the State Water Board or the appropriate regional water quality control board (RWQCB) indicating that the project will uphold state water quality standards.

Proposed Recovery Plan for the Sacramento River Winter-Run Chinook Salmon

In August 1997, NMFS released the *Proposed Recovery Plan for the Sacramento River Winter-Run Chinook Salmon* (NMFS 1997) to identify and prioritize actions necessary to restore naturally sustaining populations of winter-run chinook salmon and to prevent further degradation of the population's viability and genetic integrity. This plan recommends actions associated with objectives designed to protect and restore the run in the Central Valley. Actions include protecting and restoring spawning and rearing habitat, improving survival of downstream migrants, and reducing the impacts of other fish and wildlife management programs.

Anadromous Fish Restoration Program

The Central Valley Project Improvement Act (CVP) directs the Secretary of the Interior to develop and implement a program that makes all reasonable efforts to double natural production of anadromous fish in Central Valley streams relative to the average levels attained during the period of 1967–1991 (Section 3406[b][1]). The program is known as the Anadromous Fish Restoration Program. The Restoration Plan is a programmatic-level description of the program in broad and general terms, which guides the long-term development of the program. The Restoration Plan presents the goal, objectives, and strategies of the Anadromous Fish Restoration Program, which includes measures to protect and restore natural channel and riparian habitat values through habitat restoration actions; modifications to Central Valley Project operations, and avenues for implementation. The USFWS and the U.S. Bureau of Reclamation jointly implement the Central Valley Project Improvement Act (USFWS 2001).

STATE REGULATORY SETTING

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the California Department of Fish and Game (DFG) is required for projects that could result in take of a plant or animal species that is state listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2080.1 consistency determination or a Section 2081 incidental take permit.

Section 1600 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream or lake in California that supports wildlife resources is subject to regulation by DFG, under Sections 1600–1603 of the California Fish and Game Code. Section 1601 states that it is unlawful for any agency to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake designated by DFG, or use any material from the streambeds, without first notifying DFG of such activity. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. Accordingly, a DFG Streambed Alteration Agreement must be obtained for any project that would result in diversions of surface flow or other alterations to the bed or bank of a river, stream, or lake.

The State Water Board's California Ocean Plan for Areas of Special Biological Significance

Section 13170.2 of the California Water Code directs the State Water Board to formulate and adopt a water quality control plan for ocean waters of California. The State Water Board first adopted this plan, known as the California Ocean Plan, in 1972. Over the years the plan and Public Resources Code have been amended to bolster the protection of important coastal and marine areas.

The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the state's coastal waters. The plan applies to point and nonpoint source discharges and the plan provides numeric and narrative water quality objectives for discharges to marine environments (Table 4.2-1), including bacterial, physical, chemical, biological, and radioactivity standards for offshore water quality. For the most part, these standards, which are intended to protect aquatic resources, are more stringent than those for contact recreation, but are less stringent than those applied to drinking water to protect public health (see Table 4.1-4, "Water Quality Objectives Addressing Bacteria or Pathogens").

Table 4.2-1
Water Quality Objectives

	Units of Measurement	Limiting Concentrations		
		6-Month Median	Daily Maximum	Instantaneous Maximum
Objectives for Protection of Marine Aquatic Life				
Arsenic	µg/l	8	32	80
Cadmium	µg/l	1	4	10
Chromium (Hexavalent) (see below, a)	µg/l	2	8	20
Copper	µg/l	3	12	30
Lead	µg/l	2	8	20
Mercury	µg/l	0.04	0.16	0.4
Nickel	µg/l	5	20	50
Selenium	µg/l	15	60	150
Silver	µg/l	0.7	2.8	7
Zinc	µg/l	20	80	200
Cyanide (see below, b)	µg/l	1	4	10
Total Chlorine Residual (For intermittent chlorine sources see below, c)	µg/l	2	8	60
Ammonia (expressed as nitrogen)	µg/l	600	2,400	6,000
Acute Toxicity	TUa	N/A	0.3	N/A
Chronic Toxicity	TUc	N/A	1.	N/A
Phenolic Compounds (non-chlorinated)	µg/l	30	120	300
Chlorinated Phenolics	µg/l	1	4	10
Endosulfan	µg/l	0.009	0.018	0.027
Endrin	µg/l	0.002	0.004	0.006
HCH	µg/l	0.004	0.008	0.012
Radioactivity	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations. Reference to Section 30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.			
Chemical	30-day Average (µg/l)			
	Decimal Notation	Scientific Notation		
Objectives for Protection of Human Health — Noncarcinogens				
Acrolein	220	2.2×10^2		
Antimony	1,200	1.2×10^3		
bis(2-chloroethoxy) methane	4.4	4.4×10^0		
bis(2-chloroisopropyl) ether	1,200	1.2×10^3		

Table 4.2-1 Water Quality Objectives		
chlorobenzene	570	5.7×10^{2}
Chromium (III)	190,000	1.9×10^{5}
di-n-butyl phthalate	3,500	3.5×10^{3}
dichlorobenzenes	5,100	5.1×10^{3}
diethyl phthalate	33,000	3.3×10^{4}
dimethyl phthalate	820,000	8.2×10^{5}
4,6-dinitro-2-methylphenol	220	2.2×10^{2}
2,4-dinitrophenol	4	4.0×10^{0}
ethylbenzene	4,100	4.1×10^{3}
fluoranthene	15	1.5×10^{1}
hexachlorocyclopentadiene	58	5.8×10^{1}
nitrobenzene	4.9	4.9×10^{0}
Thallium	2	$2. \times 10^{0}$
Toluene	85,000	8.5×10^{4}
tributyltin	0.0014	1.4×10^{-3}
1,1,1-trichloroethane	540,000	5.4×10^{5}
Objectives for Protection of Human Health — Carcinogens		
acrylonitrile	0.10	1.0×10^{-1}
Aldrin	0.000022	2.2×10^{-5}
Benzene	5.9	5.9×10^{0}
Benzidine	0.000069	6.9×10^{-5}
Beryllium	0.033	3.3×10^{-2}
bis(2-chloroethyl) ether	0.045	4.5×10^{-2}
bis(2-ethylhexyl) phthalate	3.5	3.5×10^{0}
carbon tetrachloride	0.90	9.0×10^{-1}
Chlordane	0.000023	2.3×10^{-5}
chlorodibromomethane	8.6	8.6×10^{0}
chloroform	130	1.3×10^{2}
DDT	0.00017	1.7×10^{-4}
1,4-dichlorobenzene	18	1.8×10^{1}
3,3’-dichlorobenzidine	0.0081	8.1×10^{-3}
1,2-dichloroethane	28	2.8×10^{1}
1,1-dichloroethylene	0.9	9×10^{-1}
dichlorobromomethane	6.2	6.2×10^{0}
dichloromethane	450	4.5×10^{2}

Table 4.2-1 Water Quality Objectives		
1,3-dichloropropene	8.9	8.9×10^{0}
Dieldrin	0.00004	4.0×10^{-5}
2,4-dinitrotoluene	2.6	2.6×10^{0}
1,2-diphenylhydrazine	0.16	1.6×10^{-1}
halomethanes	130	1.3×10^{2}
heptachlor	0.00005	5×10^{-5}
heptachlor epoxide	0.00002	2×10^{-5}
hexachlorobenzene	0.00021	2.1×10^{-4}
hexachlorobutadiene	14	1.4×10^{1}
hexachloroethane	2.5	2.5×10^{0}
isophorone	730	7.3×10^{2}
N-nitrosodimethylamine	7.3	7.3×10^{0}
N-nitrosodi-N-propylamine	0.38	3.8×10^{-1}
N-nitrosodiphenylamine	2.5	2.5×10^{0}
PAHs	0.0088	8.8×10^{-3}
PCBs	0.000019	1.9×10^{-5}
TCDD equivalents	0.0000000039	3.9×10^{-9}
1,1,2,2-tetrachloroethane	2.3	2.3×10^{0}
tetrachloroethylene	2.0	2.0×10^{0}
toxaphene	0.00021	2.1×10^{-4}
trichloroethylene	27	2.7×10^{1}
1,1,2-trichloroethane	9.4	9.4×10^{0}
2,4,6-trichlorophenol	0.29	2.9×10^{-1}
vinyl chloride	36	3.6×10^{1}

a) Dischargers may at their option meet this objective as a total chromium objective.

b) If a discharger can demonstrate to the satisfaction of the Regional Board (subject to EPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, effluent limitations for cyanide may be met by the combined measurement of free cyanide, simple alkali metal cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by the approved method in 40 CFR PART 136, as revised May 14, 1999.

c) Water quality objectives for total chlorine residual applying to intermittent discharges not exceeding two hours, shall be determined through the use of the following equation:

$\log y = -0.43 (\log x) + 1.8$

where: y = the water quality objective (in µg/l) to apply when chlorine is being discharged;

x = the duration of uninterrupted chlorine discharge in minutes.

Source: State Water Resources Control Board 2005

Other water quality objectives that provide some protection of biological resources include thresholds established from baseline conditions, such as that dissolved oxygen content shall not be less than 10% of what occurs naturally as well as the pH shall not be more that 0.2 units from what occurs naturally. Nutrients shall not cause objectionable aquatic growths or degrade indigenous biota. Numeric standards are set for a wide variety of constituents (see Table 4.2-1). For biological characteristics the plan states marine communities shall not be degraded and that shellfish and fish be fit for human consumption.

Both the State Water Board and the six coastal Regional Water Boards implement and interpret the California Ocean Plan. The California Ocean Plan identifies the applicable beneficial uses of marine waters. These beneficial uses include preservation and enhancement of designated areas of special biological significance (ASBS), rare and endangered species, marine habitat, fish migration, fish spawning, shellfish harvesting, recreation, commercial and sport fishing, mariculture, industrial water supply, aesthetic enjoyment, and navigation. To date, 34 ASBS are classified within the state. Thirteen occur north of the San Francisco Bay, seven along the Central Coast, and the remaining 14 occur in southern California, 10 of which are islands.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, “waters of the state” fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin plan establishes numerical or narrative water quality objectives to protect established beneficial uses, which include wildlife, fisheries and their habitats. Projects that affect wetlands or waters of the state must meet discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

LOCAL REGULATIONS

Numerous California cities and counties have adopted regulations that directly address the construction, operation, maintenance, and monitoring of OWTS. These local agencies regulate OWTS through a variety of means, including ordinances and permitting requirements. Circumstances vary among agencies, but the local environmental or public health department is generally responsible for enforcing these regulations. Examples of local regulations related to OWTS are provided in Section 3.0 “Regulatory Setting.” Additionally, counties and cities have adopted plans, policies, and regulations for the protection and enhancement of natural resources, including heritage trees, important natural features, habitat alteration, and common and special status species. The siting and construction of OWTS is subject to CEQA, administered by the lead agency permitting the projects (typically houses approved by cities of counties) that also allow for the installation of OWTS.

4.2.2 ENVIRONMENTAL SETTING

RANGE OF REPRESENTATIVE CONDITIONS

A variety of habitats across the bioregions of California may be affected by OWTS; however, the most affected systems are those that are 303(d)-listed water bodies and systems where the total maximum daily loads (TMDLs) for pollutants indicate that OWTS are contributing to bacteria and/or nutrient impairment. OWTS are more likely to cause water quality issues in lakes and ponds, slow moving streams, seasonal and perennial drainages, estuaries, and bays. Other habitats may also be affected but to a lesser extent. A discussion of the known effects of particular constituents of concern and their effects on wildlife and habitat is provided below.

WASTEWATER CONSTITUENTS OF CONCERN

Typical wastewater constituents of concern are identified in Chapter 2, and their effects on water quality and public health are detailed and discussed in Section 4.1, “Hydrology and Water Quality” (see also Table 2-5).

The following discusses only certain constituents that could indirectly or directly affect wildlife and/or their habitat. These are presented as a background for the chemical baseline in which contemporary biota survive.

Major Constituents of Concern

Pathogens

Pathogenic microorganisms that affect wildlife and humans include bacteria, viruses, and parasitic protozoa. However, not all human pathogens also cause disease in wildlife. Communicable diseases in wildlife that are caused by pathogenic microorganisms are commonly spread through direct or indirect contact or ingestion of contaminated water or food or via an intermediary organism. Although OWTS can be a source of pathogens, many endemically occurring pathogens can be found in waters not affected by OWTS where most wildlife have some type of immunological reaction to the pathogens, particularly within healthy ecosystems. Bacteria and viruses from sewage and other sources that pose a health risk to humans can build up in the tissues of bivalve shellfish and cause food safety concerns for human consumers. However, little is known about the potential effect of pathogens from these anthropogenic sources have on the shellfish themselves or other fish and wildlife that consume such shellfish. In many areas of California, shellfish harvesting advisories exist primarily to protect human health from the harmful effects of pathogenic protozoa, bacteria, and viruses.

Waterborne pathogens can be transported great distances. Two types of introduced protozoa have been found to infect and sometimes kill the federally endangered southern sea otter. Around 2001, dead or stranded sea otters were being found along the shoreline of the Central Coast. Tissue samples of the dead otters were examined and the affects of a protozoa, *Toxoplasma gondii*, which is spread through domestic cat feces, was found to be lethal to the otters (Conrad et. al. 2005). Additionally, sea otters have been found to be infected by *Cryptosporidium*, a protozoan that causes severe diarrhea in humans (Conrad et. al. 2005). Both of these protozoa are thought to have infected the otters through stormwater runoff or sewage outfalls. Currently, contamination of protozoan pathogens in marine and freshwater systems is monitored by examining the concentrations of *Cryptosporidium* oocysts in bivalves (e.g., mussels, clams) residing in waters contaminated by fecal matter.

Biochemical Oxygen Demand

Dissolved oxygen is a basic requirement for a healthy aquatic ecosystem, and biochemical oxygen demand (BOD) is regulated in OWTS effluent as one means of maintaining adequate oxygen levels. Most fish and beneficial aquatic insects “breathe” oxygen dissolved in the water column. Some fish and aquatic organisms (such as carp and sludge worms) are adapted to low oxygen conditions, but most desirable fish species (such as trout and salmon) suffer if dissolved oxygen concentrations fall too low. Larvae and juvenile fish are more sensitive and require even higher concentrations of dissolved oxygen. Many fish and other aquatic organisms can recover from short periods of low availability of dissolved oxygen. However, prolonged episodes of decreased concentrations of dissolved oxygen can result in “dead zones” or hypoxic (low oxygen) events within water bodies. The hypoxic conditions in such areas, or during such events can lead to mortality of aquatic species, including fish and sessile (stationary, attached) invertebrates.

Oxygen concentrations in the water column fluctuate under natural conditions, but severe depletion usually results from human (anthropogenic) activities that introduce large quantities of limiting nutrients into surface waters which stimulate primary productivity (phytoplankton and macrophyte growth). The increased plant biomass that is created during this process represents a biochemical oxygen demand because when it decays, the decomposition process consumes oxygen. Biochemical oxygen demand is a measure of the amount of oxygen required by aerobic microorganisms to decompose all of the readily biodegradable organic matter present within a sample of water. Other factors such as temperature, elevation, stream velocity/mixing, and salinity can influence the amount of oxygen dissolved in water. Prolonged hot weather will decrease oxygen concentrations and may cause fish kills even in clean waters because warm water cannot hold as much oxygen as cold water.

Dissolved Nutrients

Nitrogen is a critical and naturally occurring element that is essential for the production of amino acids, the building blocks of proteins, and therefore, is a nutrient essential to all forms of life. As described in Section 4.1, "Water Quality and Public Health," nitrogen concentrations in OWTS effluent are typically substantial. Nitrogen is abundant in the atmosphere and dissolves in water as the gas N_2, but most plants and animals are not able to assimilate this form of nitrogen. To be assimilated, N_2 must first be transformed to more chemically available forms of nitrogen such as ammonium (NH_4^+), nitrate (NO_3^-) or organic nitrogen [e.g., urea - $(NH_3)_2CO$]. The inert nature of N_2 means that biologically available nitrogen is often in short supply in natural ecosystems, limiting plant growth and biomass accumulation.

Nitrogen fixation, which is the chemical transformation of gaseous nitrogen to $NH_4^{+,}$ is predominantly carried out by nitrogen fixing bacteria and blue-green algae, although lightning and forest fires to a lesser extent also fix nitrogen. Once in the form of NH_4^+, nitrogen is available for use by plants and is quickly incorporated into proteins or other forms of organic nitrogen. NH_4^+can also be further transformed by aerobic bacteria into NO_3^- through the bacteria-mediated aerobic process called nitrification. NO_3^-can also be assimilated by plants, or converted back to N_2 through the bacteria-mediated anaerobic process called denitrification. As a consequence, nitrogen is a precious commodity in most undisturbed natural systems (Vitousek 1997).

Human activities have increased the abundance of nitrogen in our environment in a variety of ways. Fertilizer used on crops and lawns, energy production, concentrations of domesticated animals and their wastes, and human waste all have made huge amounts of nitrogen available to the environment (Vitousek 1997). However, it is possible to have" too much of a good thing", as recent studies have shown. Excess nitrogen from human activities has begun to overwhelm the natural nitrogen cycle with a range of ill effects: from disruption of soil chemistry and subsequent diminished soil fertility to toxic algal blooms (Vitousek et al. 1997:7–10).

In marine aquatic systems in particular, because of naturally low levels of nitrogen that limit primary production, and in some freshwater systems, increased nitrogen inputs can result in eutrophication of the water body. Eutrophication begins with nutrient enrichment of waters, primarily with input of nitrogen or phosphorus. Because plant growth is typically nutrient-limited, high nitrogen influxes from a lot of OWTS discharges together and/or combined with nitrogen inputs from other sources (e.g., POTW discharges, agricultural runoff) can fuel excessive growth of algae and macrophytes, leading to algal blooms and both floating and submerged mats of algae and macrophytes. As microorganisms decompose these large quantities of plant material, they take up oxygen from the water. Consequently, large amounts of phytoplankton and algae growth can lead to severe depletion of water oxygen reserves, a condition known as "hypoxia" (low oxygen), resulting in fish kills, decreases in zooplankton populations that support fish and other aquatic species, and release of decomposition-related gases, such as carbon dioxide, methane, and hydrogen sulfide, and toxins. Declines in fish and zooplankton populations, odor production, and toxic effects can result in not only loss of major functions of the water resources, but also breakdowns in structure and function of affected communities.

Eutrophication is a process that occurs naturally under certain conditions and typically over long periods of time; however, anthropogenic contributions have made the frequency and duration of eutrophication more common and catastrophic. An extreme example of this occurrence may be found within the delta of the Mississippi River in the Gulf of Mexico, where a "dead zone" extends over thousands of square miles as a result of over application of fertilizers and other point and nonpoint source pollution within the watershed.

While over enrichment of waters with NH_4^+ and NO_3^- can result in eutrophication which may have an indirect effect on fish, ammonia, which is the un-ionized form of the same compound (NH_3), can have a direct adverse effect on fish populations. NH_3 easily passes through gill membranes into the bloodstream and can be toxic to fish. High concentrations of NH_3 are known to cause behavioral, physiological, and histological changes in fish (Evans et al. 2006, State Water Board 2006). However, this is generally more of a problem in confined, warm, high pH water bodies (e.g., ponds).

Additionally, some algal blooms that are stimulated by excessive nutrient inputs can sometimes produce biotoxins. Bivalve shellfish, which feed on the phytoplankton that comprise these blooms, can accumulate these biotoxins in their tissues. Eating shellfish with high levels of these biotoxins can lead to serious and potentially fatal illness in humans. Paralytic Shellfish Poisoning (PSP), as well as Amnesic Shellfish Poisoning (ASP) and Diarrhetic Shellfish Poisoning (DSP) are the most common human illnesses associated with these biotoxins. While this phenomenon is generally considered a human health risk, evidence is growing suggesting that higher trophic marine species may be bioaccumulating these toxins through consumption of affected bivalves, and this build up of toxins may have a negative effect on turtles, dolphins, manatees, and other marine mammals (NOAA and WHOI 2007). As techniques for detecting algal toxins in animal tissues have advanced, so has the appreciation of the number of marine mammal deaths linked to algal blooms. In fact, more than 50% of the unusual marine mortality events are now associated with these blooms (NOAA, WHOI 2007). Sea lion mortalities along the southern California coastline have been conclusively linked to diatom toxins passed through the food web (Scholin et. al. 2000). Also more common cyanobacteria blooms in freshwater can cause mortality to birds and fish in confined environments (e.g., ponds, lakes).

Phosphorus, like nitrogen, is an important component for living cells. It is an essential element of adenosine triphosphate (ATP), the primary energy carrier in higher organisms. As a mineral it is generally found in low concentrations in nature and is considered a limiting nutrient for plant growth. Excess phosphate found in waterways is not toxic like nitrogen can be; however, as is the case with nitrogen, excessive influxes of phosphorus can stimulate aquatic plant growth in aquatic systems, particularly fresh waters which are typically phosphorus limited. Therefore, over enrichment with phosphorus may also lead to eutrophication and hypoxic conditions in some aquatic systems.

Additionally, phosphate along with excess nitrogen have been implicated in increasing abundance of parasites by creating nutrient-rich aquatic systems that support increased numbers of host species (such as snails) that feed on algal blooms. This in turn has lead to conditions that allow aquatic systems to be inundated with once uncommon parasites. Amphibian deformities, which have increased some 20–30% in the last decade, have been, in part, attributed to increased parasitism to tadpoles found in nutrient-rich waters (Science Daily News 2007).

Total Suspended Solids and Turbidity

Turbidity and total suspended solids (TSS) are naturally present in water and generally contain minerals and organic molecules that provide benefits such as nutrients. However, anthropogenic activities (including OWTS discharges) may increase TSS that carry pollutants and contaminants as outlined above. Additionally, sediments may physically block sunlight, precipitate out and smother benthic macroinvertebrates (e.g., mayflies), fish and amphibian eggs and aquatic plants. Also, when TSS levels are exceedingly high, fish and other aquatic species may suffocate. TSS and turbidity are therefore particularly important for recovery of some threatened fish species (e.g., steelhead and chinook salmon).

For coastal areas high TSS transport from drainages can dump sediment and a variety of undesirable pollutants out to marine habitats. In 1994 a cooperative effort of 12 government agencies examined conditions in the coastal waters between Point Conception and the United States-Mexico international border. Based on samples collected in 1994, the survey examined water and sediment quality and the condition of the fish and bottom-living organisms in the area. The findings indicated that 90% of the sediment on the southern California coastal shelf is contaminated, though generally at low levels; and conversely, 91% of the area of the southern California coastal shelf supports bottom-dwelling animals typical of natural uncontaminated, bottom sediments (EPA 1998). Subsequent water quality monitoring of California coastal areas indicated similar results (State Water Board 2006).

Other Constituents of Concern

Toxic Organic Compounds

A number of organic compounds may be found in contaminated waters, as outlined in Table 2-5, “Typical Wastewater Pollutants of Concern” in Chapter 2, “Background and Project Description,” and OWTS effluent is one source that can introduce some of these compounds into the aquatic environment. Sometimes these compounds are referred to as persistent organic pollutants. These compounds may be directly absorbed across an animal’s skin or through a fish’s gills as it extracts dissolved oxygen from water. In high concentrations these may cause direct mortality. Lower concentrations may result in deformities in fish and other aquatic wildlife, which may be the consequence of diets containing toxic organic compounds. With continued exposure over the course of an animal’s life, some contaminants will accumulate in its body. This may result in a reduced growth rate, reduced chances for successful reproduction, impairment of physiological processes, and reduced life spans. Moreover, if the animal is eaten by a predator, its body burden of contaminants is transferred, beginning the process of biomagnifications or bioaccumulation of contaminants up the food chain. As you move up the food chain, the diet becomes progressively higher in contaminants and contaminant concentrations.

Marine mammals are near the top of the food chain and are considered sentinel species for marine health. Tissue assays of southern sea otters and other marine mammals have revealed a staggering concentration of compounds such as polychlorinated biphenyls (PCBs) once used as a coolant; polybrominated diphenyl ethers (PBDEs), a flame retardant; solvents such as polycyclic aromatic hydrocarbons (PAHs); and pesticides such as the banned dichlorodiphenyltrichloroethane (DDT) (Miller et al. 2007). Investigations into the compounding effects of organic toxins on the sea otter’s welfare remain inconclusive. Studies of harbor seals’ chronic exposure to these types of compounds point to immune stress (NOAA 2005). Studies on smaller aquatic species have examined the uptake of contaminants by juvenile chinook salmon in the San Francisco Bay, where stomach contents of juveniles sampled from the Bay contained elevated levels of PCBs and other chlorinated pesticides, as did juveniles sampled from the Sacramento River Delta and from hatcheries (NMFS 1997).The majority of these compounds are not associated with domestic waste; however, they exemplify the persistence and widely dispersed nature of these types of chemicals.

In bird species the affects from contamination of DDT has been well documented for decades, but the affects of other compounds, especially in combination, is still largely unknown. A variety of afflictions have been reported, including deformities, tissue damage, and behavioral, reproductive, and developmental effects.

Metals

As with human exposure, mercury and lead are known to have deleterious effects on wildlife. Metals are naturally occurring minerals but anthropogenic activities have generated large quantities that have been released into the atmosphere or into wastewater. For the most part, OWTS effluent is not a primary pathway for metals entering the ecosystem. Mercury is not easily taken up by organisms until it is transformed into methyl mercury through a bacterial process that occurs much more readily in aquatic (anaerobic) habitats. This process is enhanced by certain environmental factors, including the acidity of the water into which the mercury is deposited.

Methylated mercury is ingested by invertebrates and fish. It is bioaccumulated as it moves up the food chain. Although outright mortality is rare, mercury levels found in fish-eating birds (e.g., loons, mergansers, ospreys, eagles, herons, kingfishers) are often more than sufficient to cause reproductive impairment and aberrant behavior. Such increased levels, found primarily in lower pH water bodies (i.e., northeastern states and Canadian provinces) have been linked with lower egg production, an increased number of infertile eggs, and a higher incidence of embryonic or early hatchling mortality (Environment Canada 2005). Water quality monitoring of the San Francisco Bay has determined that high concentrations of mercury warrant fish consumption advisories for fish caught in the Bay (State Water Board 2006). Additionally, heavy metals in general have been fingered as one particular issue with respect to the recovery of the chinook salmon (NMFS 1997).

Endocrine-Disrupting Compounds

Endocrine disruptors are unique because of structural similarities with endogenous (those that are produced by an animal) hormones, their abilities to interact with hormone transport proteins, or their abilities to disrupt hormone metabolism. Many persistent organic pollutants can mimic or in some cases block the effects of the endogenous hormones (Jensson 2006). In either case, these chemicals disrupt the normal actions of endogenous hormones and, thus, have become known as endocrine-disrupting chemicals (EDCs). Examples of environmental pollutants with endocrine-disrupting properties are some organochlorine (OC) pesticides, phthalates, alkylphenolic compounds, PCBs, and so on. Additionally, personal care products, pharmaceuticals, plastics, synthetic hormones, and household solvents have been implicated as EDCs and are the more common EDCs in OWTS effluent.

This newly emerging area of research has many unknowns but has been a topic of more intensive research since the 1990s. It appears EDCs are turning up in nearly all organisms, especially higher trophic levels. Biologists in Europe have noted an alarming increase in reproductive and developmental effects such as feminization, decreased fertility and hemaphroditism in organisms exposed to estrogen and progesterone associated with wastewater treatments plants (Kuster et. al. 2005). Nearer to California, Lake Mead’s carp population within Las Vegas Bay has shown similar endocrine disruption stemming from sewage treatment outfalls and urban run off (USGS 2006). The effects EDCs pose to the long-term health of wildlife and fisheries are still largely unknown; however, in more confined systems, the effects may be more readily apparent.

REGIONAL OVERVIEW

California contains a wide variety of bioregions, from desert environments below sea level, to coastal areas, to alpine areas of 14,000 feet or more in elevation. The diversity of geography colliding with temperature and moisture leads to a significant diversity of biological resources. California has the highest total number of species and the highest number of endemic species within its borders of any state. California also has the highest number of rare species (species typically listed under the federal ESA or the California ESA), and about one-third of those species are at risk, meaning these species have the potential for local or global extinction.

California is divided geographically into bioregions, which are classified by relatively large areas of land or water, which contain characteristic, geographically distinct assemblages of natural communities and species. The biodiversity of flora, fauna, and ecosystems that characterize a bioregion tend to be distinct from that of other bioregions. California is divided into 10 bioregions: Modoc, Klamath/North Coast, Sacramento Valley, Bay/ Delta, Sierra, San Joaquin Valley, Central Coast, Mojave Desert, South Coast, and Colorado Desert.

Modoc Bioregion

This bioregion is also referred to as the Modoc Plateau and the Southern Cascade regions. The Modoc bioregion extends across California’s northeast corner from Oregon to Nevada, and south to the southern border of Lassen County. The physical geography of the region includes flats, basins, valleys, lava flows, and mountains. High desert and forests are the dominant vegetation communities. Several major lakes (Goose, Eagle, and Tule) and Mount Lassen (10,450 feet in elevation) are dominant physical features. The bioregion shares many similarities with the Great Basin region that forms much of its eastern boundary. The area’s large lakes provide critical habitat for migratory birds (USGS 2003).

Counties within this bioregion include all or portions of Plumas, Siskiyou, Butte, Tehama, Shasta, Lassen, and Modoc, which support relatively sparse population bases including the municipalities of Susanville and Alturas. This bio region comprises the northern quarter of the Lahontan Hydrologic Region.

Source: FRAP 2007

California Bioregions **Exhibit 4.2-1**

Klamath/North Coast Bioregion

The Klamath/North Coast bioregion extends roughly one-quarter of the way down the 1,100-mile coast and east across the Coastal Ranges and into the Cascades. The region extends from the Oregon border to Point Arena and from the continental shelf to the Central Valley, including the looming Mount Shasta (14,160 feet tall) near the eastern boundary. The region is one of rugged relief, with severely sheared, faulted, and folded mountains forming parallel ridges and river valleys. It also has coastal terraces, lagoons, and populated floodplains, as well as off-shore islands, estuaries, and subtidal deep-water habitats (USGS 2003). The California bioregional classification system does not include offshore and tidal areas. The marine portion of this bioregion is within two categories of California's marine and ocean classification system: Southern Oregonian Province and Central Ocean (CERES 2006). Numerous rivers in this region offer spawning grounds for anadromous fish (e.g., salmon), including the Eel, Trinity, Klamath, Russian, Smith, Salmon, Scott, Mad, and Mattole Rivers. Large lakes include Clear Lake, Whiskeytown Lake, Clair Engle Lake, and the western part of Shasta Lake.

The region includes all or portions of 10 counties: Del Norte, most of Siskiyou, Humboldt, Trinity, Mendocino, Lake, and the northwestern portions of Shasta, Tehama, Colusa, and Glenn. The region's rugged and remote nature supports low population numbers. The largest cities in the region are Redding at the northern end of the Central Valley and Eureka in Arcata Bay. This bioregion encompasses all of the North Coast Hydrologic Region.

Sacramento Valley Bioregion

This bioregion makes up the northern portion of California's Great Valley, extending south roughly from Redding in the north to the northern edge of the Sacramento–San Joaquin River Delta (Delta) at the confluence of the Sacramento and American Rivers. The eastern boundary spans the northern third of the Sierra Nevada foothills. The landscape is relatively flat, consisting of basins, plains, terraces, alluvial fans, and scattered hills or buttes.

Counties incorporated in this populated bioregion are Sutter, most of Sacramento, and Yolo and portions of Butte, Colusa, Glenn, Placer, Shasta, Tehama, and Yuba. Sacramento is the bioregion's largest city with other large cities including Redding, Chico, Davis, West Sacramento, and Roseville, making it the fourth most populous of the 10 bioregions. This bioregion covers a fraction of the Central Valley Hydrologic Region.

Bay/Delta Bioregion

The Bay/Delta bioregion extends from the Pacific Ocean to the Sacramento Valley and San Joaquin Valley bioregions to the northeast and southeast, and a short stretch of the eastern boundary joins the Sierra bioregion at Amador and Calaveras Counties. The bioregion is bounded by the Klamath/North Coast bioregion on the north and the Central Coast bioregion to the south (CERES 2005). The marine and ocean areas are categorized as the Oceanic bioregion and the northern portion of the Central Ocean bioregion. These bioregions include two-thirds of California's coast, extending down to Point Conception north of Santa Barbara. The Bay/Delta bioregion is one of the most populous, encompassing the San Francisco Bay Area and the Delta.

The bioregion fans out from San Francisco Bay in a jagged semi-circle that takes in all or part of 12 counties: Marin, Contra Costa, Santa Clara, Alameda, Solano, San Mateo, San Francisco, Sonoma, Napa, San Joaquin, and parts of Sacramento and Yolo. Major cities include San Francisco, Santa Rosa, Oakland, Berkeley, Vallejo, Concord, and San Jose. Though of moderate size, the Bay/Delta bioregion is the second most populous bioregion. This bioregion contains portions of the San Francisco Bay and Central Valley Hydrologic Regions.

Sierra Bioregion

The Sierra bioregion is named for the Sierra Nevada mountain range that is approximately 380 miles long and extends from the Feather River in the north to Tejon Pass in the Tehachapi Mountains to the south. The bioregion extends along California's eastern boundary and is largely contiguous with Nevada. It is bounded on the west by the Sacramento Valley and San Joaquin bioregions. Included in the region are the headwaters of 24 river basins extending to the foothills on the west side and the base of the Sierra Nevada escarpment on the east side (USGS 2003). These watersheds generate much of California's water supply provided by runoff from the Sierra snowpack.

Eighteen counties, or their eastern portions, make up the Sierra bioregion: Alpine, Amador, Butte, Calaveras, El Dorado, Fresno, Inyo, Kern, Madera, Mariposa, Mono, Nevada, Placer, Plumas, Sierra, Tulare, Tuolumne, and Yuba. The larger cities include Truckee, Placerville, Quincy, Auburn, South Lake Tahoe, and Bishop (CERES 2005). This bioregion encompasses portions of Lahontan, Central Valley, and Mojave Hydrologic Regions.

San Joaquin Valley Bioregion

The San Joaquin Valley bioregion is bordered by the Coast Ranges on the west and the southern two-thirds of the Sierra bioregion on the east. This bioregion is in the heart of California and is the state's top agricultural region, producing fruits and vegetables in its fertile soil.

Eight counties are found within the bioregion: Kings, most of Fresno, Kern, Merced, and Stanislaus and portions of Madera, San Luis Obispo, and Tulare. This growing bioregion, the third most populous, still contributes to the state's top 10 counties in farm production value (CERES 2005). Large communities include Fresno, Merced, Modesto, and Bakersfield.

Central Coast Bioregion

The Central California Coast bioregion includes marine, freshwater, and terrestrial resources. The bioregion extends some 300 miles from just north of the city of Santa Cruz to just south of the city of Santa Barbara, and inland to the floor of the San Joaquin Valley. The edge of the continental shelf forms the western boundary; on the east the region borders the Central Valley bioregion. The marine and ocean areas are categorized as the Central Ocean bioregion and the Southern California Bight. These marine regions extend from Cape Mendocino in the north to Point Conception in the south (CERES 2006).

The bioregion encompasses the counties of Santa Cruz, Monterey, San Benito, Santa Barbara, and portions of Los Angeles, San Luis Obispo, Fresno, Merced, Stanislaus, and Ventura. Large cities include Monterey, San Luis Obispo, and Santa Barbara. The bioregion also encompasses all of the Central Coast and Los Angeles Hydrographic Regions.

Mojave Desert Bioregion

The Mojave Desert is located in southern California, southern Nevada, northeastern Arizona, and southwestern Utah. In California, the bioregion comprises the southeastern portion of the state, roughly east of the Sierra bioregion to the Transverse Ranges in the west, where this region abuts the Colorado Desert near Twenty Nine Palms. The geography is defined by widely separated mountain ranges and broad desert plains, and ranges in elevation from 280 feet below sea level in Death Valley National Park to over 11,000 feet on Telescope Peak. Much of the region is at elevations between 2,000 and 3,000 feet.

Seven counties make up the Mojave bioregion: nearly all of San Bernardino, most of Inyo, the southeastern tips of Mono and Tulare, the eastern end of Kern, the northeastern desert area of Los Angeles, and a piece of northern-central Riverside County. The largest cities are Palmdale, Victorville, Ridgecrest, and Barstow (CERES 2005). The Mojave Desert Bioregion is within the southern portion of the Lahontan Hydrographic Region.

Colorado Desert Bioregion

The Colorado Desert bioregion is the western extension of the Sonoran Desert found primarily in Arizona and Mexico. The region occupies the southeastern area of California to the border with Arizona and Mexico. It includes the Imperial Valley and Colorado River and abuts the South Coast bioregion within the Peninsular

Ranges. Elevation varies from 230 feet below sea level at the Salton Sea to over 8,000 feet in the Peninsular Ranges, but averages around 1,000 feet. The landform is typified by alluvial fans, bajadas, playas, dunes, desert plains and steep sparsely vegetated mountains. Average precipitation is around 4 inches per year (USGS 2003).

This sparsely populated bioregion encompasses all of Imperial County, the southeastern portion of Riverside County, the eastern end of San Bernardino County, and the eastern portion of San Diego County. Its most prominent cities are Palm Springs, Rancho Mirage, and El Centro (CERES 2005). This bioregion is completely within the Colorado River Hydrographic Region.

South Coast Bioregion

This bioregion encompasses terrestrial and marine resources from Point Conception on the north to the border with Mexico (USGS 2003). It extends from the outer edge of the continental shelf to the base of the Transverse and Peninsular Ranges. This bioregion is comprised of off-coast islands, narrow mountain ranges, broad fault blocks, alluvial lowlands, and coastal terraces. Elevation ranges from sea level to over 11,400 feet (San Gorgonio Mountain). The aquatic resources include subtidal and intertidal marine and deep water habitats (USGS 2003). The California classification system does not include offshore and tidal areas; however, this region is defined within the California ocean system as the Southern California Bight (CERES 2006).

Counties included in this region are Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. This region is highly populated and continues to grow at a high rate (USGS 2006). This bioregion spans San Diego, Santa Ana and Los Angeles Hydrographic Regions.

4.2.3 ANALYSIS OF ENVIRONMENTAL IMPACTS

Water quality issues that may affect biological resources may be caused by a large spectrum of constituents which may be introduced by a number of different sources. Most impacts on biological resources occur indirectly as a result of degradation of surface water quality, whether a stream, creek, pond, lake, river, estuary or bay. The majority of OWTS contaminate groundwater, which would not directly impact biological resources because these resources generally have no contact with the groundwater. However, because groundwater typically is connected to a surface water, OWTS can contribute to surface water contamination, and therefore have the potential to indirectly affect biological resources that may occur in or rely on the affected surface water resource.

The potential for OWTS to cause water quality impacts that would affect biological resources is dependant on the magnitude of the contamination or mass loading from OWTS in the watershed. A single OWTS would not likely have a substantial effect on the mass loading of contaminants to a surface water; however, the mass loading from high densities of OWTS within a watershed together with inputs from other sources such as agricultural, recreational (golf courses, etc), storm, or urban runoff, can have a substantial effect on water quality which could lead to adverse impacts on biological resources. The San Lorenzo River Basin within the Central Coast bioregion and the Malibu Creek watershed located in the South Coast bioregion are good examples. The watersheds surrounding these 303(d)-listed water bodies contribute sediment, pathogens, nutrients as well as other constituents to marine environments located within an ASBS. Eutrophication leading to excessive algal and aquatic plant growth, low oxygen levels, and shellfish harvesting advisories, has been the result of this contamination. However, the vast majority of OWTS do not cause significant adverse indirect effects on biological resources.

THRESHOLDS OF SIGNIFICANCE

The potential for the OWTS regulations to result in significant environmental effects was analyzed using information and criteria provided in the California Environmental Quality Act (CEQA) Guidelines. Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact on biological resources if it would:

- have a substantial adverse effect, either directly or indirectly through habitat modifications, on the population of any species identified as a candidate, sensitive, or special-status species in regional or local plans, policies, or regulations, or by DFG or USFWS;
- have a substantial adverse effect on any riparian or other sensitive natural community identified in local or regional plans, policies, or regulations or by DFG or USFWS;
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh and vernal pools) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan.

APPROACH AND METHODS

The impact analysis for aquatic biological resources compares existing conditions to conditions that would exist with implementation of the proposed statewide OWTS regulations. These comparisons are based primarily on the water quality impact analysis in Section 4.1, "Hydrology and Water Quality," because impacts to aquatic biological resources would occur as a result of impacts from OWTS discharges on water quality.

The construction and operation of OWTS can cause a variety of impacts on biological resources. However, these impacts can be difficult to quantify. Water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water and (2) criteria (i.e., numeric or narrative limits) to protect those beneficial uses. Biological resources are among the "beneficial uses" as defined in Section 13050(f) of the Porter-Cologne Water Quality Control Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation (beneficial uses are discussed in Section 4.1-4, "Beneficial Uses," of this document). California water quality objectives (or "criteria" under the Clean Water Act) are found in the Basin Plans adopted by the State Water Resources Control Board and each of the nine Regional Water Quality Control Boards. Some of these standards, as they pertain to biological resources, may be site specific or vary by season, such as for dissolved oxygen. Ammonia is pH and temperature dependent. Limits for some of the metals are hardness dependent. Toxicity thresholds may vary depending on some of these parameters and depend on length of exposure as well (e.g., 4-day average, 1-hour average). Therefore numeric water quality standards are often not explicitly defined for biological resources under federal, state, or local plans and regulations as they are for human health thresholds. Therefore, much of this impact discussion is based on qualitative information.

Indirect impacts to biological resources may occur during the construction of OWTS, which typically involves the excavation of trenches and other ground-disturbing work that can cause the erosion of soil, habitat loss, and displacement of wildlife. Furthermore, off-site erosion and stormwater runoff can pollute streams and other receiving waters, especially if best management practices (BMPs) for standard stormwater and erosion controls are not followed or are not successful. Operation of properly functioning OWTS generally would have no direct effects on terrestrial biological resources, but could still cause direct impacts on water quality in sensitive freshwater and marine ecosystems, which in turn, could result in indirect adverse effects on aquatic habitat (estuaries, lakes, rivers, and ponds). Species that occupy aquatic systems or whose life cycles are interconnected to these systems could also be affected. Impacts would vary substantially because of many variables. As described in Section 4.1 in detail and summarized in Section 4.2.2, these variables that control the potential for OWTS to affect surface water quality include effluent quality and constituents of concern, physical soil substrate and chemistry, underlying geology, groundwater conditions, and proximity of OWTS to surface waters.

Summary of Key Project Components

The project, depending on the assessment of the applicable water bodies, could improve effluent water quality from the more than 7,000 OWTS located within 600 feet of impaired surface waters (as defined by the criteria in Section 4.1, "Hydrology and Water Quality") The following elements of the draft regulations (divided by the type of systems being addressed) are of particular importance to this analysis of impacts on biological resources.

New Systems

For new systems, proper siting, soils analysis, and groundwater studies would be required so that OWTS could be designed to minimize the risk of hydraulic failure and maximize soil treatment effectiveness. The vertical separation and depth to groundwater must meet minimum standards and must meet application rates based on soil texture.

New and Replaced Systems

OWTS would be designed to disperse effluent to subsurface soils in a manner that maximizes unsaturated zone treatment of organic material and other pollutants in the effluent. Construction standards would be applied more uniformly and would meet industry standards.

Supplemental Treatment Units

OWTS with supplemental treatment units that meet more stringent performance standards would be allowed in sensitive areas to provide additional levels of treatments to ensure greater protection of the environment. These systems would require professional maintenance, monitoring, and inspections to ensure proper functioning.

OWTS near Impaired Surface Waters

Most importantly the new regulations have a more stringent set of requirements specific to OWTS located in areas within 600 feet of a water body that has been listed as impaired by bacteria or nutrients under Section 303(d) of the Clean Water Act, and for which a Regional Water Board has determined in an adopted TMDL that OWTS contribute to the impairment of the water body (see Table 2-2, Exhibits 3-1a–f, and Appendix E). Many of these listed waters support special status species, anadromous fish habitat, or include sensitive habitat such as bays or estuaries. In these areas, owners of existing OWTS must either obtain a study showing that their systems do not contribute to the impairment or convert their OWTS to include a supplemental treatment unit applicable to the type of impairment (disinfection in pathogen impaired areas, and denitrification in nutrient impaired areas). New OWTS constructed in these areas must also include supplemental treatment. Exemptions are allowed for areas where the Regional Water Board has adopted a TMDL requiring implementation of a wastewater management plan; Table 2-3 identifies areas that currently meet the requirements for this exemption. Table 2-4 lists areas in California that are within impaired areas but do not yet have adopted TMDLs; once TMDLs are adopted for these areas (as required by federal law), some of these areas may be subject to the requirements outlined above.

Targeted Areas of Impairment

As described above, a key portion of the draft regulations focuses on areas that are (1) within 600 feet of a water body that (2) has been listed for bacteriological or nutrient impairment under Section 303(d) of the Clean Water Act (3) for which the Regional Water Board has adopted a TMDL (4) that designates OWTS as contributing to the impairment. For the purposes of this analysis, areas that meet this four-part definition are referred to as "targeted areas of impairment." The term is intended to clarify that only areas adjacent to certain impaired waters in California, rather than all water bodies designated by the USEPA as impaired in California, would be affected by the additional requirements in the proposed regulations. Targeted areas of impairment are listed in Table 2-2 and shown in Exhibits 3-1a–f. More detailed maps showing these areas are provided in Appendix E of this draft environmental impact report.

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Implementation of the proposed project would improve aquatic habitat conditions associated with 303(d)-listed waters with OWTS-related impairment, particularly for waters with elevated levels of nutrients, pathogens, total dissolved solids and turbidity, biochemical oxygen demand, and dissolved inorganic compounds, and thereby would improve protection of fish and wildlife. The enforcement of water quality thresholds is a feature included in the proposed regulations primarily to protect drinking water and public health. The water quality thresholds established for drinking water and public health are typically higher (more protective) than the established thresholds for the protection of wildlife and aquatic life and their habitats.

Other key beneficial project components (outlined above) include more stringent and consistent monitoring of domestic wells on sites with OWTS, which may lead to the identification of an OWTS-related contamination issue long before there are effects to biological resources. Supplemental treatment systems may be required in other sensitive areas (near wetlands, anadromous fish habitat, estuaries) that are not currently listed as 303(d) impaired waters under the proposed regulations. These and other components strive to prevent OWTS-related contamination of groundwater, therefore improving protection of surface water conditions, which in turn, would benefit biological resources.

The proposed regulations would not result in modification of the habitat of a special-status species or population identified by regional or local plans, policies, or regulations, or by DFG or USFWS. These regulations would not have substantial adverse effects on riparian or other sensitive natural communities identified in local or regional plans, policies, or regulations or by DFG or USFWS. Siting of OWTS remains subject to local approvals, and the regulations do not enable siting of OWTS; the regulations primarily address operation and design considerations. The footprint of the OWTS would not be substantially different under the regulations compared with current siting criteria.

Siting requirements in the proposed statewide OWTS regulations limit installation of treatment systems to areas with at least 3 feet of separation between the infiltrative surface of the OWTS dispersal system and seasonal high groundwater for conventional systems, and at least 2 feet of separation for OWTS with supplemental treatment systems that provide BOD and TSS removal. For these reasons, OWTS would not be constructed in areas where their installation could directly contaminate, remove or fill wetlands. The proposed regulations could benefit riparian and aquatic habitats, and thereby existing conditions particularly for aquatic species, by providing additional protections to safeguard water quality.

The analysis that follows does not address the following thresholds because the project impacts are minimal or are nonexistent; these are described here but are not addressed further in the impact discussions. The proposed new regulations would not conflict with local policies or ordinances protecting biological resources, including the California Ocean Plan and water quality standards for freshwater and marine ecosystems, or conflict with the provisions of an adopted HCP, NCCP, or other approved state, regional, or local HCP because any existing regulations or provisions of plans that are more conservative than these proposed regulations would supersede these regulations. In other words, if these other regulations are more protective than the proposed statewide OWTS regulations, they would remain in effect to provide the additional protection they already provide. Furthermore, no migratory movement corridor used by native resident or migratory fish or wildlife species or use of native wildlife nursery sites would be affected under these regulations.

Impacts on Biological Resources from Construction of OWTS

IMPACT 4.2-1 **Impacts on Fisheries, Sensitive Habitats and Communities, Special-Status Species, and Federally Protected Wetlands from Construction of OWTS in Areas Other Than Targeted Areas of Impairment.** *The proposed regulations could lead to an increase in OWTS repairs, replacements, and upgrades on sites that already have been disturbed; these previously disturbed areas are highly unlikely to support sensitive habitat that could be affected by repairs or replacement. With respect to new OWTS, as previously described these regulations do not alter the local land use agency process associated with ground-disturbing activities from residential and commercial development. This impact is considered* ***less than significant****.*

As described under Impact 4.1-1 in "Water Quality and Public Health," the proposed regulations could lead to an increase in OWTS repairs, replacements, and upgrades. These changes would occur on sites that already have been disturbed and contain existing OWTS and associated residential or commercial structures, and by virtue of their ongoing use are highly unlikely to support sensitive habitat that could be affected by repairs or replacement. With respect to new OWTS, as previously described these regulations do not alter the local land use agency process associated with ground-disturbing activities from residential and commercial development. The regulations only affect the design of OWTS, not whether land uses associated with OWTS would be permitted. Therefore, impacts on biological resources related to typical ground-disturbing activities and water quality effects associated with the new OWTS regulations are considered **less than significant**.

No mitigation is required.

IMPACT 4.2-2 ***Impacts on Fisheries, Sensitive Habitats and Communities, Special-Status Species, and Federally Protected Wetlands from Construction of OWTS in Targeted Areas of Impairment.*** *All OWTS in targeted areas of impairment would be required to include supplemental treatment. Existing OWTS in these areas that need to be replaced or significantly upgraded to comply with this requirement must do so within a 2-year time frame. This could lead to the concentration of a large amount of ground disturbance concentrated close to impaired surface waters within a short time frame. Construction and replacement activities could cause sediment, OWTS effluent, and debris to wash into wetlands, seasonal and/or perennial drainages, adjacent receiving waters, which could affect water quality to the degree that it could degrade wetlands or sensitive aquatic habitat such as estuaries, bays, and riparian areas. The result would be harmful to fisheries and special-status species. Therefore, this impact is considered* ***potentially significant****.*

The proposed regulations would require most owners of conventional OWTS in targeted areas of impairment to assess their OWTS and potentially convert their existing systems to OWTS with supplemental treatment units. Such OWTS upgrades or replacements would need to be completed within a 2-year time frame. As discussed in the "Water Quality and Public Health" section under Impact 4.1-2, "Direct Impacts Associated with Construction of OWTS in Targeted Areas of Impairment," this could lead to the concentration of a large amount of construction activity within 600 feet of impaired surface waters within a short time frame. Construction and replacement activities could cause sediment, OWTS effluent, and debris to enter wetlands, seasonal and/or perennial drainages, and ultimately lakes or estuaries. Additionally, storm events could cause newly constructed sites to erode, flushing sediment into receiving waters. As discussed previously, TSS and sediments could physically block sunlight, precipitate out of suspension and smother benthic macroinvertebrates (e.g., mayflies), fish and amphibian eggs, or aquatic plants, which could lead to suffocating fish and other aquatic life. TSS and turbidity are particularly problematic for fisheries, especially in those streams and rivers that are critical for recovery of a species (e.g., steelhead and chinook salmon). Sediments could also transport other contaminants to receiving waters, including nutrients, pathogens, and other organic materials in stormwater runoff. Nutrients may promote eutrophication and hypoxia within the receiving waters, which could increase the mortality of special-status species, while pathogens that could be present in stormwater runoff, such as *Toxoplasma* and *Cryptosporidium* could adversely affect mammals (i.e., harbor seals, sea otters) and other species as described above.

Where areas larger than 1 acre could be disturbed, the activities would be subject to the requirements of the statewide National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activity. However, in the majority of cases, construction activities at individual sites are not anticipated to affect more than 0.5 acre, and as discussed and addressed further in the "Water Quality and Public Health" section under Impact 4.1-2, "Direct Impacts Associated with Construction of OWTS in Targeted Areas of Impairment," not all jurisdictions have local BMP requirements related to sedimentation and erosion control for construction activities disturbing less than 1 acre that are sufficient to avoid water quality impacts. Therefore, where targeted areas of impairment are located in jurisdictions with inadequate BMP requirements, compliance with the proposed draft regulations could lead to sediments, erosion, or deposits of hazardous materials washing into adjacent waters, which could affect water quality to the degree that it could degrade wetlands or sensitive aquatic habitat such as estuaries, bays, and riparian areas. The result would be harmful to fisheries and special-status species. Therefore, this impact is considered **potentially significant**.

Mitigation Measure 4.2-2: Implement Mitigation Measure 4.1-2, "Modify the Proposed Regulations to Require Implementation of Erosion and Sediment Control Measures during OWTS-Related Construction Activities in Targeted Areas of Impairment." This mitigation measure is described in detail in Section 4.1, "Water Quality and Public Health."

Implementation: The application of Mitigation Measure 4.2-2 is the responsibility of the State Water Board.

Significance after Mitigation: Implementing Mitigation Measure 4.2-2 would reduce indirect impacts on biological resources caused by water quality degradation associated with widespread conversion of conventional OWTS in targeted areas of impairment to a **less-than-significant** level because this requirement would prevent large-scale mobilization and transport of sediment and hazardous materials off-site during OWTS-related construction activities. Implementation of Mitigation 4.2-2 would reduce the impacts to **less than significant** because implementation of minimum BMPs would adequately protect surface waters, which may support sensitive habitat or biological resources, from water quality degradation caused by erosion, sedimentation, and runoff of hazardous materials.

Indirect Impacts on Biological Resources from Pathogen Contamination

IMPACT 4.2-3

Indirect Impacts on Biological Resources from Pathogen Contamination Caused by Operation of OWTS Statewide. The retention and die-off of most, if not all, observed pathogenic bacterial indicators and viruses occurs within 2–3 feet below the soil's surface in a properly designed and sited, normally functioning OWTS, and most bacteria are removed within the first 1 foot vertically or horizontally from the trench-soil interface at the infiltrative surface of coarse soils with a mature biomat. Moreover, soil filtration is more likely to remove protozoa than other waterborne pathogens because protozoa are larger. Surface water contamination from OWTS discharges can affect biological resources in a variety of ways.

The proposed regulations would require OWTS dispersal systems to be sized using application rates similar to those in the current EPA design manual, which, according to EPA, achieve 99% removal of bacteria and viruses in properly operating OWTS (EPA 2002). Additionally, mandatory septic tank inspections, use of effluent filters, and application rate requirements proposed under the new regulations would decrease the incidence of surface failures and improve effluent quality, which in turn would improve the residence time of wastewater effluent in the soils.

The occurrence and concentration of pathogenic microorganisms in wastewater depend on the sources contributing to the wastewater, the existence of infected persons in the population, and environmental factors that influence pathogen survival rates. Viruses and protozoa appear in septic tank effluent intermittently, in varying numbers, reflecting the combined infection and carrier status of OWTS users. Therefore, such pathogens are difficult to monitor and little is known about their frequency of occurrence and rate of survival in traditional OWTS. Nevertheless, pathogens from OWTS would generally have to travel *vertically through the soil and horizontally in groundwater before reaching surface waters. The likelihood of pathogens from OWTS discharges causing substantial effects on biological resources would be low because of factors that would reduce pathogen concentrations and/or viability (i.e., predation in the soil, inactivation and die-off over time, physicochemical conditions, lack of a host). Therefore, this impact would be **less than significant**.*

Pathogens that affect wildlife include bacteria, viruses, and parasites such as protozoa. These communicable diseases are commonly spread through direct or indirect contact or ingestion of contaminated water or food or via an intermediary organism. Until recently, little research has been done on wildlife's responses to disease. Many endemically occurring pathogens are in waters that OWTS do not affect, where most wildlife have some type of immunological reaction to the pathogens, particularly within healthy ecosystems (Rachowicz et al. 2005).

As stated in the discussion of pathogens in Section 4.1.1 "Water Quality and Public Health Impacts from OWTS," the retention and die-off of most, if not all, observed pathogenic bacterial indicators and viruses occurs within 2–3 feet below the soil's surface, in a properly designed and sited, normally functioning OWTS (depicted in Exhibit 2-1) (Anderson, Lewis, and Sherman 1991; Anderson et al. 1994; Ayres Associates 1993a, 1993b; Bouma et al. 1972; McGaughey and Krone 1967; Van Cuyk et al. 2001), and most bacteria are removed within the first 1 foot vertically or horizontally from the trench-soil interface at the infiltrative surface of coarse soils with a mature biomat (University of Wisconsin-Madison 1978). Moreover, soil filtration is more likely to remove protozoa than other waterborne pathogens because protozoa are larger.

This section addresses potential indirect impacts on biological resources (e.g., fisheries and special-status species that occur in, or rely on, sensitive habitats or communities such as freshwater and marine ecosystems and federally protected wetlands) that would occur under the proposed regulations from pathogens contaminating surface waters through OWTS discharges. As discussed above, waterborne pathogens can be transported great distances, affecting wildlife and fisheries beyond the initial contamination area. Protozoa, viruses, and bacteria may all exist within OWTS effluent. However, the degree to which pathogens found in OWTS effluent may affect wildlife is not well known. Around 2001, dead or stranded sea otters were being found along the shoreline of the Central Coast. Tissue samples of the dead otters were examined and the affects of a protozoa, Toxoplasma gondii, which is spread through domestic cat feces, was found to be lethal to the otters (Conrad et. al. 2005). Additionally, sea otters have been infected by *Cryptosporidium*, a protozoan that causes severe diarrhea in humans (Conrad et al. 2005). Both these protozoa are thought to have infected the otters through stormwater runoff or sewage outfalls, not OWTS discharges. Currently, contamination by pathogens in marine and freshwater systems is monitored by examining the concentrations of *Cryptosporidium* oocysts in bivalves (e.g., mussels, clams) residing in waters contaminated by fecal matter (Conrad et al. 2005, State Water Board 2007).

As previously described in Section 4.1.1, "Water Quality and Public Health Impacts from OWTS," mandatory tank inspections (and pumping when necessary), use of septic tank effluent filters, qualified professional requirements, shallow dispersal system design requirements, and requirements for use of supplemental treatment systems that provide BOD and TSS removal where there is less than 3 feet of soil, or disinfection and TSS removal in areas adjacent to water bodies with OWTS-related pathogen impairment would improve the unsaturated residence time of OWTS effluent in the soil, which would improve the effectiveness of the soil treatment, in particular with respect to pathogens (see discussion under Impact 4.1-3).

While OWTS may contaminate groundwater and surface water with pathogens, surface water contamination is of particular concern because it affects biological resources. Surface water contamination from OWTS discharges can affect biological resources in a variety of ways, as discussed in detail above, under "Typical Wastewater Constituents of Concern." The proposed new regulations seek to improve the quality of effluent from OWTS discharges at the groundwater table (point of compliance), and thereby protect both drinking water and surface water quality. Decreasing the risk of degrading surface water, in turn, would help protect aquatic ecosystems and sensitive biological resources that depend on habitat supported by such ecosystems throughout the state.

The proposed regulations would require OWTS dispersal systems to be sized using application rates similar to those in the current EPA design manual, which, according to EPA, achieve 99% removal of bacteria and viruses in properly operating OWTS (EPA 2002). Additionally, mandatory septic tank inspections, use of effluent filters, and application rate requirements proposed under the new regulations would decrease the incidence of surface failures and improve effluent quality, which in turn would improve the residence time of wastewater effluent in the soils. While bacteria and viruses may move through groundwater to surface water, allowing for direct contact with wildlife, shellfish, or other aquatic organisms, under the proposed regulations, the OWTS effluent would spend more time in the soil substrate or liquid phase, which would kill more bacteria and viruses. Though not as small as viruses and bacteria, protozoa are more difficult to treat. Their oocysts and cysts are extremely durable, enabling them to survive a variety of treatment process. They are known to live up to 24 months in surface water. Unlike viruses, they can infect many mammal hosts with a low dose (only a few dozen oocysts are required for infection). Two types of introduced protozoa have infected and sometimes killed the federally endangered southern sea otter (Conrad et al. 2005). However, because of their larger size, soil filtration is more likely to remove protozoa than other waterborne pathogens (Cliver 2000).

Advisories for harvesting shellfish are issued seasonally in many 303(d)-listed waters because of high bacteria concentrations, which may indicate not only contamination from bacterial pathogens, but also pathogenic protozoa and viruses. The occurrence and concentration of pathogenic microorganisms in wastewater depend on the sources contributing to the wastewater, the existence of infected persons in the population, and environmental factors that influence pathogen survival rates. Such environmental factors include initial numbers and types of organisms, temperature (microorganisms survive longer at lower temperatures), humidity (survival is longest at high humidity), amount of sunlight (solar radiation is detrimental to survival), and additional soil attenuation factors, which are discussed at length in Section 4.1, Impact 4.1-3. According to the *Onsite Wastewater Treatment Systems Manual* (EPA 2002), viruses and protozoa appear in septic tank effluent intermittently, in varying numbers, reflecting the combined infection and carrier status of OWTS users. Therefore, such pathogens are difficult to monitor and little is known about their frequency of occurrence and rate of survival in traditional OWTS. Nevertheless, pathogens from OWTS would generally have to travel vertically through the soil and horizontally in groundwater before reaching surface waters. The likelihood of pathogens from OWTS discharges causing substantial effects on biological resources would be low because of factors that would reduce pathogen concentrations and/or viability (i.e., predation in the soil, inactivation and die-off over time, physicochemical conditions, lack of a host). Therefore, this impact would be **less than significant**.

No mitigation is required.

IMPACT 4.2-4 **Indirect Impacts on Biological Resources from Pathogen Contamination Caused by OWTS with Seepage Pits Statewide.** *In some areas and certain circumstances throughout the state, the proposed regulations would allow local agencies or the local Regional Water Board to permit the use of seepage pits for dispersal of effluent from new and replaced OWTS provided there is at least 10 feet of separation to seasonal high groundwater below the bottom of the seepage pit (Section 30014[k]). Where high densities of OWTS exist in fractured rock environments, the risk of pathogen contamination of nearby surface waters is significantly increased, and therefore, could result in impacts on sensitive and special-status wildlife species. This impact is considered* ***potentially significant****.*

Throughout the state, where sites are otherwise unsuitable for shallow pressurized drip or orifice dispersal or an ETI system because of either soil properties (e.g., shallow restrictive layer [clay] underlain by suitable soils) or the size of the area available at the site, including in targeted areas of impairment, the proposed regulations would allow local agencies or the local Regional Water Board to permit the use of seepage pits for dispersal of effluent from new and replaced OWTS provided there is at least 10 feet of separation to seasonal high groundwater below the bottom of the seepage pit (Section 30014[k]). As described under Impact 4.1-4 of Section 4.1.2, operation of new and replaced OWTS with seepage pits in fractured rock environments could result in potentially significant pathogen contamination of surface water bodies that are hydrogeologically connected to the receiving groundwater because pathogens could travel unabated to surface waters in a relatively short period of time. Where high densities of OWTS exist in such fractured rock environments, the risk of pathogen contamination of nearby surface waters is significantly increased, and therefore, could result in impacts on sensitive and special-status wildlife species. This impact is considered **potentially significant**.

Mitigation Measure 4.2-4: Implement Mitigation Measure 4.1-4, "Modify Section 30014(k)(3) to Require All Seepage Pits to Have At Least 2 Feet of Soil below the Bottom of the Seepage Pit , and for Seepage Pits with Between 2 and 10 feet of Soil below the Bottom of the Seepage Pit to Include a Supplemental Treatment Unit That Provides the Maximum Level of Disinfection." This mitigation measure is described in detail in Section 4.1 "Water Quality and Public Health."

Implementation: The application of Mitigation Measure 4.2-4 is the responsibility of the State Water Board.

Significance after Mitigation: Implementing Mitigation Measure 4.2-4 would reduce potential indirect impacts on biological resources from pathogen contamination caused by new and replaced OWTS that use seepage pits for dispersal to a ***less-than-significant*** level because this requirement would result in pathogen levels in discharges from these systems that would be sufficient to protect nearby surface waters in fractured bedrock environments from pathogen contamination.

Indirect Impacts on Biological Resources from Nitrogen Contamination

IMPACT 4.2-5 *Indirect Impacts on Biological Resources from Nitrogen Contamination Caused by Operation of OWTS in Areas Other Than Targeted Areas Next to Impaired Water Bodies with OWTS-Related Nutrient Impairment. Excessive nutrient enrichment of aquatic ecosystems can lead to intensive growth of algae and aquatic macrophytes (eutrophication). Introducing excessive nutrients into aquatic systems may result in conditions that could lead to mortality of sensitive fish and benthic organisms, and alteration and degradation of biological communities and sensitive aquatic habitat. The proposed regulations encourage the design of new and replaced OWTS to include shallow dispersal systems and placement in soil types that may facilitate some nitrogen removal through the process of denitrification. Additionally, use of shallow dispersal systems may facilitate more plant uptake of nutrients discharged from OWTS because the dispersal systems could be placed within the root zone of landscape vegetation. Therefore, impacts on aquatic biological resources, including fisheries; special-status species; sensitive habitats or communities, including slow-moving streams, lakes, bays and estuaries; or federally protected wetlands would be less than significant.*

Nutrient contamination of groundwater from existing improperly functioning OWTS can lead to nitrogen enrichment, primarily of surface waters that are hydrologically connected to the receiving groundwater. Excessive nutrient enrichment of aquatic ecosystems can lead to intensive growth of algae and aquatic macrophytes (eutrophication). The consequences of this enhanced growth include reduced sunlight underwater, hypoxic (low oxygen) conditions in the water, and a loss of habitat for aquatic plants and animals. Hypoxia can result in fish kills or cause fish to leave the area and can cause stress or kill bottom-dwelling organisms that cannot leave the hypoxic zone. Additionally, excess nutrients can result in "harmful algal blooms" (HABs). HABs are blooms of microscopic and macroscopic algae that produce biotoxins. These biotoxins can have toxic effects on humans and other organisms; physically impair fish and shellfish; and release odors and discolor waters or habitats (Boesch et al. 1997). Thus, introducing excessive nutrients into aquatic systems may result in conditions that could lead to mortality of sensitive fish and benthic organisms, and alteration and degradation of biological communities and sensitive aquatic habitat.

The proposed regulations encourage the design of new and replaced OWTS to include shallow dispersal systems and placement in soil types that may facilitate some nitrogen removal through the process of denitrification. Additionally, use of shallow dispersal systems may facilitate more plant uptake of nutrients discharged from OWTS because the dispersal systems could be placed within the root zone of landscape vegetation. However, discharges from OWTS are still likely to introduce nitrogen in the form of nitrates to groundwater as discussed in

Section 4.1, Impact 4.5 and Impact 4.6. While it would be unlikely that the nitrate loading contributed by a single OWTS discharge to a surface water body would excessively enrich the water with nitrogen and degrade water quality to the extent that biological resources could be affected, high densities of OWTS near a surface water body may cause or substantially contribute to eutrophication of the surface water, which in turn could negatively effect biological resources, However, the Regional Water Boards are charged with monitoring water quality and protecting beneficial uses of surface waters. Compliance with regulations designed to protect those beneficial uses would be required. Therefore, impacts on aquatic biological resources, including fisheries; special-status species; sensitive habitats or communities, including slow-moving streams, lakes, bays and estuaries; or federally protected wetlands would be **less than significant**.

No mitigation is required.

IMPACT 4.2-6 *Indirect Impacts on Biological Resources from Nitrogen Contamination Caused by Operation of OWTS in Targeted Areas Next to Impaired Water Bodies with OWTS-Related Nutrient Impairment. The proposed regulations would obligate local agencies and Regional Water Boards to require denitrifying systems that produce effluent with a concentration of not more than 10 mg/L nitrate-nitrogen in areas within 600 feet of a 303(d) impaired water body listed for nutrients and for which OWTS have been identified as contributing to the impairment. In the event that the density of OWTS in an impaired watershed could be such that the mass nitrogen loading from the OWTS would exceed the nitrogen loading allocated to OWTS established in a TMDL for the impaired surface water body, the TMDL along with other regulatory processes would require regional and/or local agencies to take additional actions to meet the OWTS waste load allocation. Therefore, impacts on biological resources from operation of OWTS in targeted areas of Impairment is considered less than significant.*

The proposed regulations would obligate local agencies and Regional Water Boards to require denitrifying systems that produce effluent with a concentration of not more than 10 mg/L nitrate-nitrogen in areas within 600 feet of a 303(d) impaired water body listed for nutrients and for which OWTS have been identified as contributing to the impairment. This requirement may or may not be sufficient to protect nutrient impaired water bodies depending on whether the nutrient impairment is caused by nitrogen or phosphorus loading, and if caused by nitrogen, depending on the nitrogen loading capacity of the water body and relative contribution of OWTS to this loading. It is conceivable that the density of OWTS in an impaired watershed could be such that the mass nitrogen loading from the OWTS, even with STS that provide the required level of nitrogen removal, combined with other sources of nitrogen loading to the system would exceed the nitrogen loading allocated to OWTS established in a TMDL for the impaired surface water body. In this event, the TMDL along with other regulatory processes would require regional and/or local agencies to take additional actions to meet the OWTS waste load allocation. Therefore, impacts on biological resources from operation of OWTS in targeted areas of impairment is considered **less than significant**.

No mitigation is required.

Other Constituents of Concern

IMPACT 4.2-7 Indirect Impacts on Biological Resources from Operational Discharges of Other Constituents of Concern Caused by OWTS Statewide. *Various OWTS constituents of concern have been identified in addition to those of primary concern. These other constituents are known to occur in wastewater effluent. Because of the lack of, or inconclusive nature of information currently available about these other constituents of secondary concern in OWTS effluent, any additional analysis regarding the impact associated with discharge of these constituents from new and replaced OWTS on biological resources would be speculative. Further research is under way on this topic by federal and state agencies and research groups. At this time, however, no further analysis can be conducted based on the existing information and no conclusion can be made.*

As described in Impact 4.1-8, various OWTS constituents of concern have been identified (Table 4.1-1) in addition to those of primary concern (Table 2-6). These other constituents are known to occur in wastewater effluent. For some constituents, not enough is known (numerous studies have been completed but they are inconclusive) about their concentration in wastewater effluent, and at what concentration they would adversely affect public health (e.g., traces of EDCs, pharmaceuticals, and personal care products). For others, the characteristics that determine the transport and fate of the contaminants and the effectiveness of properly sited and functioning OWTS systems are sufficient to attenuate the contaminants, effectively limiting their ability to adversely affect biological resources (see Section 2.6.2, "Occurrence of Other Constituents of Secondary Concern").

Because of the lack of or inconclusive nature of information currently available about these other constituents of secondary concern in OWTS effluent, any additional analysis regarding the impact associated with discharge of these constituents from new and replaced OWTS on biological resources would be speculative. The proposed regulations would not impose requirements to address other constituents of secondary concern, but further research is under way on this topic by federal and state agencies and research groups. In the future, if research indicates there is a substantial public health concern associated with these constituents, the State Water Board would consider the regulatory framework for addressing attendant issues. At this time, however, no further analysis can be conducted based on the existing information and no conclusion can be made.

No mitigation is required.